

## ABSTRACT OF THE INVENTION

A Lorentz Force magnetometer based on a mechanical resonator including a resonant, vibrating electrically conducting string or insulating fiber 5 coated with an electrically conducting material and its response to a Lorentz Force wherein the string or fiber, fixed at two ends, is tensioned over two frets (supports) separated by a distance, L, hence, becoming mechanically resonant with high Q. The frets constrain the position of the string or fiber but not the angle it makes with the fret, thus, permitting measurement of multiple vector magnetic fields. The magnetometer can be easily manufactured in arrays with the tension 10 and, hence, resonant frequency for each magnetometer being rapidly, sequentially, and dynamically varied through the use of, e.g., piezo/MEMS elements. If the fiber is light conducting, a compact and sensitive detector using light escaping from an aperture in the conducting material coating the fiber can 15 be implemented.